The MANGOS OF CUBA

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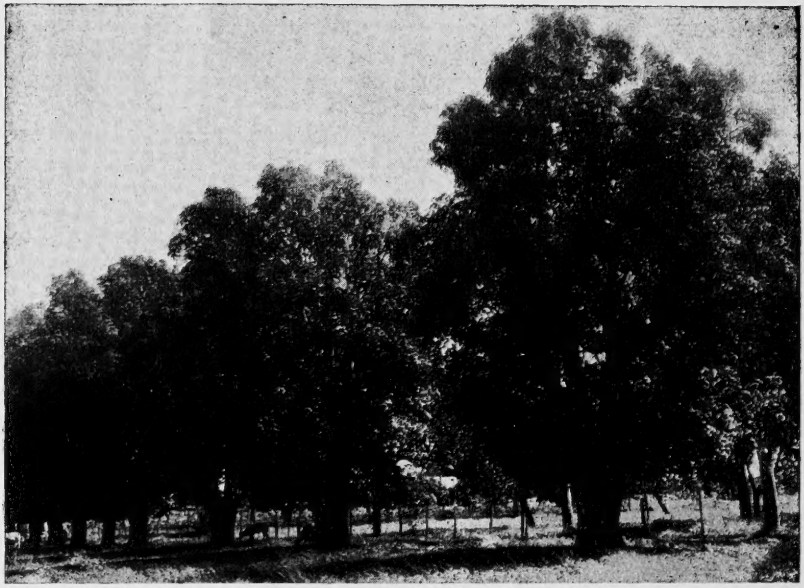
(PLATES.)

SEEDLING TREE OF THE MANGA RACE, NEAR SANTIAGO DE LAS VEGAS.



OLD SEEDLING TREES OF THE MANGO RACE, NEAR SANTIAGO DE LAS VEGAS.

THE MANGOS OF CUBA.

WILSON POPENOE, *Washington, D. C*

Cuba must be numbered among those tropical countries in which the mango is King of Fruits. Whether one grants that it is the finest fruit in the island—and there is no lack of Cubans who will affirm this to be a fact—one is forced to admit that it is by far the most abundant. It springs up on all sides, wherever a seed chances to fall upon favorable ground, forming a large, handsome tree which embellishes the landscape and provides in the summer months a wealth of luscious fruit.

It is but natural that there should be found, among the innumerable seedling trees scattered over the island, a number of distinct races and types. It has long been recognized, in certain parts of the tropics, that many seedling mangos come more or less "true to type" when propagated from seed, and because of this fact the natives have learned to recognize certain of the best defined types and have distinguished them with varietal names. With the avocado, another fruit extensively grown in Cuba, this is not the case; seedling forms are innumerable, but names are not used to distinguish the different ones, probably because it has been learned that the offspring of a superior tree do not reproduce the characteristics of the parent to any extent, and because no well defined classes of seedlings can be pointed out.

With mangos a different state of affairs obtains. The best known seedling races and types, such as *mango*,* *manga amarilla* and *manga blanca*, are recognizable by anyone who has the least familiarity with the fruit, and there can be do doubt but that seedlings of these classes will, in the majority of cases, reproduce the characteristics of the parent to a great enough extent to make them recognizable as belonging to the same type as the parent. We must admit the possibility, for the time being, that occasional seedlings may depart from the type, perhaps because of cross pollination, perhaps because of some other cause. Occasional aberrant forms are found in Cuba which can only be accounted for by some such explanation as cross pollination. On the whole, however, it can be considered that the various races and types described in this paper

*To those unfamiliar with the popular classification of mangos in Cuba, it may seem peculiar that this name, which properly belongs to all fruits of *Mangifera indica*, should be used to distinguish a race. It must be explained that the natives commonly divide mangos into two classes, which they distinguish by the names of *mango* and *manga*, the masculine and feminine forms of the word. It has been thought best, therefore, to retain this name in its Cuban application.

VENDOR OF MANGOS, GUANAJAY. THE FRUITS ARE SEEDLINGS OF THE MANGO RACE.

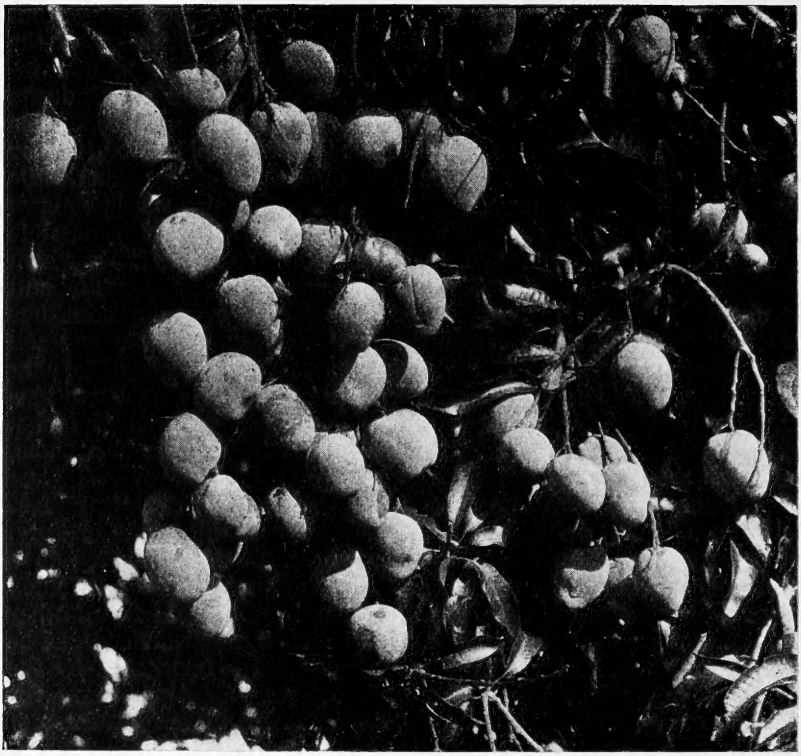
come true from seed, in so far as concerns the characteristics which distinguish the group.

This peculiar characteristic of coming true from seed, a thing very rare among tree fruits, must be attributed in seedling mangos to polyembryony, a phenomenon which has long been known to occur in mangos. While it has never been thoroughly studied, and much remains to be learned about it, the investigations of Belling have thrown considerable light on the subject. Belling, working at the Florida Experiment Station in 1908, found that in one race of mangos, known as No. 11 in Florida and Jamaica, *mango* in Cuba, the seeds were commonly polyembryonic, *i. e.* contained more than one embryo, and gave rise to as many as eight or ten plants. A microscopic examination of numerous young fruits showed that these several embryos were not the product of fertilization of the egg cell in the ovary (the normal method of producing new individuals in all the higher plants), but that they arose as minute vegetative buds in the nucellar tissue surrounding the egg cell. The trees which they produce are, therefore, comparable to budded or grafted trees, in that they should reproduce more or less exactly the characteristics of the parent. Belling did not find a single embryo which had developed from a fertilized egg cell, but it is possible that the occasional trees of these well known seedling types which do not come true may have developed from fertilized egg cells, and would, therefore, be as capable of variation as ordinary seedlings of other tree fruits. It remains to be shown whether the egg cell ever develops into an embryo in polyembryonic mangos, and to what extent they may be affected by cross pollination. No investigations have been made with monoembryonic mangos, such as Mulgoba, Bennett and other grafted varieties grown in Florida and Cuba, but with these we are not concerned here.

As Cuba was known to possess a large number of interesting races and types, it was thought worth while to devote the month of July, 1915—the season during which most of the mangos ripen—to a thorough investigation of Cuban mangos, in order to learn as much as possible concerning their relationships, productiveness and other characteristics, and to bring to light choice types which might be worthy of propagation. This work was greatly facilitated by the hearty co-operation of the Cuban Sub-Secretary of Agriculture, Sr. Arias, who appointed Sr. Gonzalo M Fortún, Ayudante Tecnico of the Departamento de Botanica at the Estacion Agronomica Experimental to travel with me through the island and assist in the investigations. I am also greatly indebted to Prof. J. T. Crawley, Director of the Estacion Agronomica Experimental, and to Prof H. A. Van Hermann, Chief of the Division of Agricultural Vulgarisation of the Department of Agriculture, for valuable assistance in the work.

Distribution of the Mango in Cuba.

The mango is widely distributed throughout Cuba, but it was seen most abundantly in the region around Habana, where it is a conspicuous feature of the landscape, and in the hills back of Santiago



SHOWING THE FRUITING HABITS OF THE MANGA AMARILLA TYPE.
SANTIAGO DE LAS VEGAS.

de Cuba. Toward Pinar del Rio, the tree was not seen as commonly as farther eastward, though for the first thirty or forty miles after leaving Habana it is abundant over the countryside. Between Habana and Matanzas the tree is fairly common, and it is rather extensively grown in some of the old Quintas of the Yumuri Valley, near Matanzas. Farther west in Matanzas province we found it less abundant. Around Santa Clara it is fairly abundant. At Cienfuegos there are a number of groves and quite a few scattering trees, but it is not so abundant outside the town as in some other sections of the island. At Trinidad, on the south coast a short distance east of Cienfuegos, we found plenty of trees, many having become naturalized in the mountains from seeds dropped by the *guajiros* (countrymen), returning to their homes in the mountain valleys. Toward Camagüey the trees were less frequent on the plains. Around the town of Camagüey itself, however, the mango is fairly abundant, but the types are seemingly rather inferior. The nomenclature of the groups seems to change in this region, and the names applied in Habana, Matanzas, and Santa Clara provinces, are no longer used. At Santiago de Cuba mangos are very abundant, and during the season they are hauled into the markets every morning by the cart load. Farther east in Oriente province, however, we saw comparatively few trees, and at Guantanamo most of the best mangos were being shipped in from Santiago de Cuba.

The common seedling races, *mango* and *manga*, are pretty well distributed throughout the island, and in most localities are practically the only ones grown. There are, however, a few places which possess unusually choice types and are noted for them throughout the island. Chief among such places are Cienfuegos and Santiago de Cuba. With the exception of the Filipino, which is found around Habana and which I have never seen in eastern Cuba, the best mangos of the island are probably grown near these two cities. In the outskirts of Cienfuegos there is a garden known as the Quinta Aviles, now the property of the Asturian Society, which contains a large number of old mango trees, including a wider range of types than I have seen in any other Cuban collection. The well known mango Chino and manga Mamey are found in this quinta, and from it the markets of Habana are supplied with fruits of both of these types. Mango Chino is now grown in other gardens near Cienfuegos, the seeds having been taken from the Quinta Aviles.

At Santiago de Cuba there are several types of very superior quality which are not quite so limited in distribution as are mango Chino and manga Mamey of Cienfuegos. Along the hillsides around El Caney, a few miles back of Santiago, are scattering trees of the type known as Biscochuelo, a fruit which I believe to be, everything considered, the most desirable seedling type which we studied. While inferior to Filipino in quality, it is a good fruit and so much more productive that it seems to me more valuable. The names Señora and Obispo are applied to several large and fine types which are also found around Santiago. Corazon, Mamey and Toledo are common and well defined types, but of no great merit.

They were not observed elsewhere in the island. A considerable number of types appear to be peculiar to this region, and it seems to be the belief in Oriente that they were introduced by some of the French immigrants who came over from Haiti when they were driven out of that island by the blacks.

Classification.

The classification of mangos presents some interesting problems, and as yet very little has been done toward the solution of any of them. The subject is large, and will require an infinite amount of study, yet everything seems to indicate that we will, in time, be able to have a system which will bring out the relationships of different groups and be of practical value in studying varieties. For example, the Indian variety Sandersha is characterized by unusual productiveness. Two or three other varieties which have been grown in Florida appear to belong to the same group and are also unusually productive for Indian mangos. It seems, then, that productiveness is a characteristic of this group of varieties, and when we learn that a variety belongs to this group we can at once infer that it is likely to be fruitful. The various forms of Alphonse or Alfonzo, Indian mangos which are now grown in Florida, also seem to have much in common when it comes to bearing habits. The question may, therefore, be considered a practical one, and not unworthy of attention.

First of all, it is necessary to emphasize the need of a natural system of classification, as opposed to an artificial or arbitrary one, in which mangos are grouped according to the shape of the fruit or some other character of this nature. Such a system, while perhaps useful, does not really meet our needs, and should be avoided. A system taking into consideration natural affinities of varieties or types, however, cannot fail to be of great value in our study of the mango.

Arbitrary systems of classification have been proposed by one or two Indian pomologists, but have never been used. A few attempts have been made in India to classify varieties into natural groups, and these have been somewhat more successful, but they have never been carried far enough. The best known instance of a natural classification is probably that attempted by Maries, in Watt's Dictionary of Economic Products of India, but the field is so extensive that Maries probably covered but a small portion of it, and did not make a very thorough study of even that portion.

In this country, practically the only effort to classify mangos is that which has been made by Professor Rolfs of Florida, and is set forth in his bulletin "Mangos in Florida" (Bul. 127, Fla. Agricultural Experiment Sta.). Prof. Rolfs has formed nine groups into which he places the mangos of the Miami region, both those of Indian origin and the local seedling forms. This is an effort along the right line, but much remains to be done before the subject will be thoroughly worked out.

In this attempt at classifying the principal seedling mangos of Cuba, an effort has been made to recognize relationship and degree of relationship as well. The first and broadest division is therefore into groups for which I have used the term *race;* the second is into *types,* of which several may be comprised in one race. This classification has been made necessary by the fact that the *manga blanca* and *manga amarilla* of Cuba, though quite distinct, are evidently more closely related to each other, judging by characteristics of growth, inflorescence and fruit, than they are to any fruits of the *mango* race. As they are seedlings, however, we cannot apply the term variety to them, and I have, therefore, termed them types. Some of these types correspond to the divisions Prof. Rolfs has termed *groups,* but for seedling fruits I believe the term *type* is better. The word group rather implies an assemblage of related horticultural varieties or forms, while these seedling types such as *manga amarilla,* as seen in Cuba, are so constant that the term group does not seem fitting. In considering horticultural varieties, however, it would seem more natural to throw them together into groups, each group containing a number of allied varieties, or those having several characteristics in common. There is naturally some slight variation within each type and any of these variations, if propagated asexually (by budding or grafting) would constitute a true horticultural variety.

This classification would comprise, then, three divisions; the first and broadest one is *races,* the second seedling *types,* several of which may be included in one race, and the third horticultural *varieties,* which are propagated by budding or grafting, and of which several may be included in one type.

KEY TO THE PRINCIPAL CUBAN MANGOS.

A. Tree erect, height 60 to 70 feet; crown open, oval or ovate in form; panicle 8 to 12 inches long, the axis rather slender, reddish maroon; fruit strongly compressed laterally, with curved and beaked apex, color yellow, often blushed with crimson, the fiber long and coarse; season June to July.

———Race 1. *Mango.*

AA. Tree not erect, but spreading, height only 35 to 40 feet; crown not open, but dense, not oval or ovate but dome-shaped or flat-topped; panicle shorter, 6 to 10 inches long, the axis very stout, pale green, tinged reddish; fruit not strongly compressed, very plump, the beak wanting, color yellow to orange without reddish blush, fiber long and fine; season July to August.

———Race 2. *Manga.*

B. Fruit elongate, oval to ovate, deep orange-yellow, the flesh bright orange.

———Type 1. *Manga amarilla.*

TYPICAL FRUIT OF THE MANGO RACE, SHOWING THE CHARACTERISTIC FORM. COMMON THROUGHOUT THE ISLANDS

BB. Fruit nearly or quite as broad as long, decidedly oblique, bright yellow in color, the flesh whitish yellow.

———Type 2. *Manga blanca.*

AAA. Tree erect, height only 30 or 35 feet; crown not open but very dense, oval or rounded; panicle very long, 12 to 24 inches, axis rather slender; pale green, sometimes tinged reddish; fruit strongly compressed laterally but sharply pointed rather than curved and beaked at apex, color lemon yellow with no reddish blush, fiber short and scanty, usually limited to ventral edge of seed; season July to August.

———Race 3. *Filipino.*

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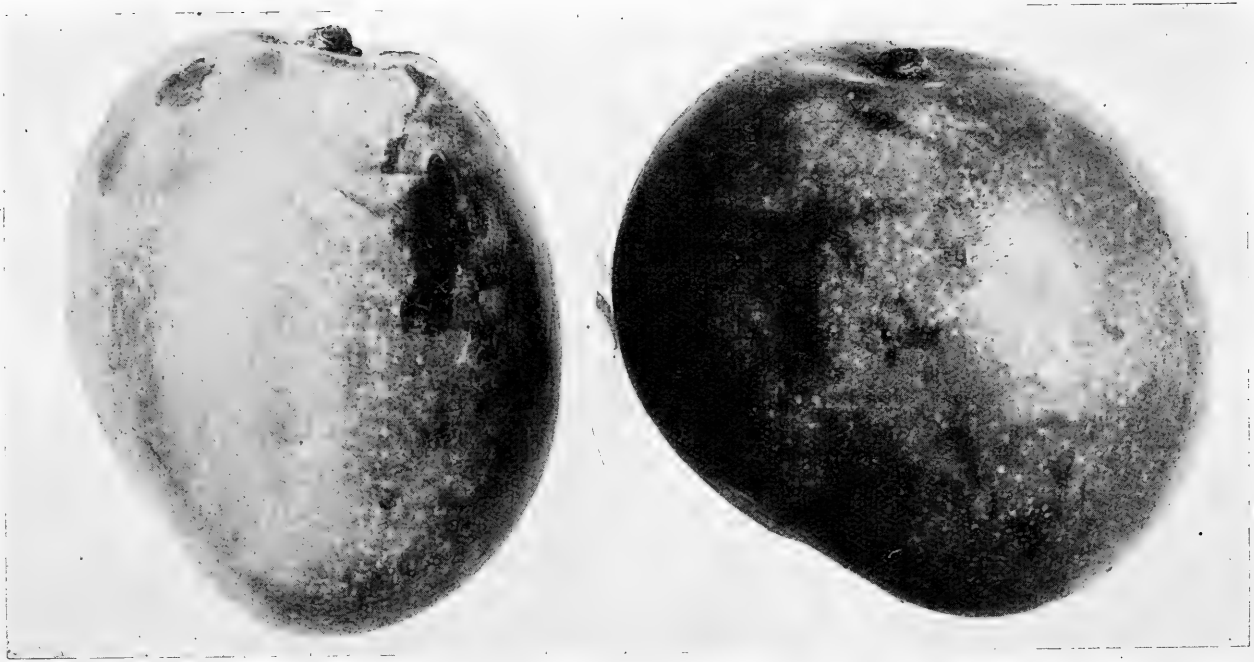
Race 1. Mango.

The mango race is by far the commonest throughout Cuba. It seems, in fact, to be the common race in other parts of tropical America as well. In Florida it has become established (at least on the east coast, near Miami) under the name of "No. 11." The tree is easily distinguished from *manga* by its form, which is erect, tall, with the crown rather open, not dense and umbrageous as in both the *manga* and *Filipino* races. The fruit also is not difficult to distinguish, being characterized by its elongated, curved form and compressed sides, making it decidedly reniform as a rule. The color varies from light yellow to crimson, there usually being a reddish blush on the cheek of yellow fruited forms. The flavor is not as sweet and rich as that of *manga*, hence the latter is nearly always preferred by the Cubans. The fiber is coarse and long, but not so abundant as in *manga*. This race is the first to ripen, coming into season in June (sometimes in May); by the time *manga* commences to ripen it is nearly gone by. It is much more subject to anthracnose than *manga*, and clean fruits are rarely obtainable. As a rule the fruits come into market badly stained with fungus, and when they are fully ripe, the disease spreads rapidly and they are soon unfit for use.

There seem to be no well-defined types of this race recognized in Cuba, though the fruit of different trees varies quite noticeably. Varietal names are often applied to individual trees. *Mango manzana* and *mango corazon* are two of the commonest names, these being applied to quite a number of forms. The race appears to have been established in Cuba a long time, and its origin is obscure.

The flowers are produced on rather loose panicles 8 to 12 inches long, the axis bright reddish maroon. The lateral branches are rather scattering, and the flowers are not so crowded as in the *manga* race. The proportion of perfect to staminate flowers is good, but not as high as in the *Filipino* race.



(*Left*) MANGA AMARILLA, FROM HABANA, SHOWING CHARACTERISTIC FORM OF THIS TYPE.

(*Right*) MANGA BLANCA, FROM HABANA. ALLIED TO M. AMARILLA, BUT LIGHTER YELLOW IN COLOR AND DISTINCT IN FORM.

The characteristics of this fruit, as seen in Cuba, are as follows:

Form varying from reniform to oblique-cordate, always somewhat compressed laterally and more or less beaked at the apex; length 2½ to 5 inches, weight 5 to 12 ounces; shoulders rarely equal, the left shoulder usually high and broad, right shoulder falling more or less abruptly; nak ¼ to ½ inch from longitudinal apex; surface smooth, color yellow green, greenish yellow or deep yellow, often washed with carmine toward the basal end, the subcutaneous dots minute and inconspicuous, rather numerous; skin thick and tough, of firm texture; flesh light orange yellow in color, very juicy, flavor subacid to sweet, not very rich nor piquant, the aroma very faint; fiber abundant, long, coarse, extending from all parts of the seed; quality rather poor; seed oblong-oblique, 3 to 3½ inches long, thick, containing 2 to 10 embryos, endocarp rather thin.

It may be possible to consider *Mango chino* of Cienfuegos and some of the other types of limited distribution as belonging to this race, but for the present I have kept them separate. The Cubans themselves usually speak of *Chino* as belonging to this class. The tree has the same characteristics of growth and the fruit is quite similar in nearly every way.

I have classed this as a *race,* since it presents many more variations than should be found in a *type.* Its seedlings in Cuba, however, usually bear a strong resemblance to each other.

Race 2. Manga.

This race includes two distinct and widely distributed types in Cuba, and there are a number of minor types, such as *Manga mamey* of Cienfuegos, which are usually considered by the natives as belonging to this class. For the present, however, I have only included in it the two important types.

The tree is easily distinguished from that of the *mango* race by its low and spreading form, dome-shaped or flat-topped, the crown being dense and not open as in *mango.* Usually it is not difficult to identify a tree of this race, unless it is growing under somewhat unnatural conditions—crowded among others, for example, so that it is forced to seek the light and hence grows abnormally tall. The fruit is not strongly compressed as in the *mango* race, being nearly or quite round in cross section, and the color is light to deep yellow or orange, the crimson blush being absent. The flesh is nearly concolorous with the skin, and is of very sweet, rich flavor, generally preferred to that of *mango;* the fiber, however, forms a dense mass around the seed, and extends throughout the flesh. It is finer than in *mango,* and is so extremely abundant that the flesh is eaten with difficulty, hence the common practice of sucking the fruits. In season the race is practically one month later than *mango,* rarely coming in before the latter part of July. The keeping qualities are very good. The fruits are not affected by anthracnose to the same degree as are those of *mango,* and are nearly always clean when offered in the markets. The race is exceedingly productive, sur-

passing in this respect all other mangos with which I have come in contact. In eastern Cuba (Camagüey province) it is known under the name of *mango de hilacha,* the classification of mango and manga not being recognized in that part of the island. In Oriente it seems to be extremely rare.

The flowers are densely crowded on short, stiff panicles usually 6 to 10 inches long, the axis being decidedly greenish. The tree blooms very profusely, but the proportion of perfect to staminate flowers is not as high as in the Filipino race. It agrees approximately in this respect with the *mango* race.

In southeastern Florida this race is predominant. The type *amarilla,* described below, is the commonest one found in the vicinity of Miami, and is usually called turpentine or peach mango. The type *blanca* is also grown, but not so extensively as *amarilla;* it is known as apple mango, or sometimes as Bombay. The Eleanor mango probably belongs to this same type, but of this I am not certain.

Type 1. Manga amarilla.

This is the commonest form, and seems to be a general favorite. It is very abundant around Habana and toward the end of July the fruit fills the markets of the city. It is of oval or ovate form, plump to almost round in cross section, sometimes slightly impressed on the ventral surface near the apex, but never distinctly beaked. The color is deep, bright orange-yellow, the flesh concolorous with the skin, and very juicy but fibrous.

The type may be described as follows:

General form oblong or oblong-ovate, rounded in cross section, the base slightly oblique with oftentimes a shallow, irregular cavity; length 2½ to 3½ inches, weight 4 to 8 ounces, left shoulder full, rounded, frequently with a broad ridge extending down the ventral edge of the fruit, right shoulder rounded to angular, not broad; apex rounded to broadly pointed, never prominently beaked and commonly depressed on the ventral surface around the slightly raised nak; surface smooth to slightly undulating, deep orange-yellow, sometimes blushed with dull salmon, and overspread with a thin grayish bloom, dots numerous, large, and conspicuous, as seems to be the rule in the manga race; skin moderately thick and very tough, peeling readily from the flesh when the fruit is fully ripe; flesh bright orange in color, becoming very soft, pleasantly aromatic; quality rather poor, flavor sweet, rich and very pleasant; fibre abundant, fine, extending from all parts of the seed through the flesh; seed oblong, rounded at both ends, 2¾ inches long, plump, containing 1 to 5 embryos, endocarp very thick and woody.

Type 2. Manga blanca.

Not as common as *amarilla,* but abundant around Habana and plentiful in the markets during the same season. It is somewhat

difficult of description, being oblique-cordate in form, decidedly oblique at the apex, and usually as broad as long. It is lighter in color than *amarilla,* and the flesh is whitish-yellow, whence the name *manga blanca.* It is scarcely as rich in flavor as *amarilla,* and not so popular, but is preferred to fruits of the *mango* race. From what I have seen of it I do not believe it is quite so prolific in fruiting as *amarilla.* The fiber is even more abundant than in the latter.

It may be described as follows:

Form oblique-cordate, broad and somewhat flattened at the base, obliquely flattened at the apex, not quite round in cross section; length 2½ to 3 inches, weight 5 to 8 ounces; left shoulder somewhat broader than right, cavity very shallow and broad; apex rounded or slightly flattened, often depressed above the nak; surface smooth, bright yellow to orange-yellow, with very large and conspicuous dots; skin thick and quite tough, peeling readily from the flesh when the fruit is fully ripe; flesh pale whitish-yellow, very juicy, faintly aromatic, quality poor; flavor sweet and pleasant; fiber very abundant, fine, extending from all parts of the seed through the flesh; seed broadly oval, nearly 2 inches long, plump, containing 2 to 5 embryos, the endocarp not quite so thick and hard as in *amarilla.*

Race 3. Filipino.

The fruits of this race are of unusually good quality, and it is unfortunate that the trees should be unproductive. To the American palate, there is probably no mango in the island equal to a good Filipino, but the Cubans usually seem to prefer a sweeter, richer fruit. Trees of the Filipino race are not common, and though distributed pretty generally over the western part of the island, they are grown in small numbers and the fruit is never very abundant in the markets.

This race has undoubtedly come to Cuba from the Philippines, probably by way of Mexico, where it is grown to a limited extent under the name of Manila mango. The fruit is nearly free from the objectionable fiber which characterizes most seedling mangos, and is of a delicious, spicy flavor which is exceedingly agreeable. Occasional trees are found in gardens as far west as Matanzas and Cienfuegos; we failed to find any in eastern Cuba but it is quite probable that a few exist. In Florida the race has become fairly well known under the name of Philippine, a shipment of seeds from Cuba having given rise to most of the old seedlings which are now found near Miami. Were it not so unproductive it would be a remarkably valuable seedling race.

The tree is erect and resembles that of the *manga* race more than *mango,* having an oval or dome-shaped crown (not flat-topped as in *manga*), with dense foliage. It is small, rarely attaining more than 30 or 35 feet in height. The leaves are frequently very large. The fruit is unique in form—long, slender and sharply pointed at the apex, distinctly flattened laterally, while the color is always greenish-yellow or when fully ripe lemon-yellow. The flesh is

TYPICAL FRUIT OF THE FILIPINO RACE. JOVELLANOS
MATANZAS PROVINCE.

meaty, of spicy, piquant flavor, with fiber only along the ventral edge of the seed. The season corresponds to that of *manga*. Anthracnose rarely attacks the fruits to a serious degree, and they are usually clean and attractive in appearance.

The flowers are produced in extremely long, rather loose panicles, 1 to 2 feet in length, the axis being light green, sometimes tinged with red. The proportion of perfect to staminate flowers is higher than in any other race I have examined, 75 per cent in some instances. The bearing habits of the tree are puzzling, and require much investigation.

The characteristics of the fruit are as follows:

Form rather variable, but in general slender oblong, compressed laterally, somewhat narrowed and oblique at the base and sharply pointed at the apex; length 4 to 6 inches, weight 6 to 12 ounces; left shoulder broad but not high, right shoulder falling abruptly; apex sharply pointed, sometimes curved slightly toward ventral side of fruit; nak scarcely distinguishable; surface smooth, pale greenish-yellow or lemon-yellow, dots numerous, small, inconspicuous; skin very thin, tough; flesh bright yellow-orange, extremely juicy, smooth, almost free from fiber, aroma faint but agreeable; quality good; flavor piquant, delicious; fiber coarse, confined to ventral edge of the seed; seed oblong, 3 to 4 inches long, thin, containing 5 to 6 embryos, the endocarp very thin and easily broken.

There seem to be no types of this race recognized in Cuba. The fruits from various trees are remarkably uniform in character, but in the native home of the race Wester has described three distinct types, Carabao, Pico, and Pahutan. A horticultural variety, Cecil, has been propagated in Florida from one of the trees grown from Cuban seed. The Cambodiana mango of Florida appears to belong to this race. Prof. Rolfs uses the name Cambodiana for the entire group, in which he includes all the types above named, as well as *Moulmein*, a seedling grown near Miami, which I have not seen.

Types of Limited Distribution.

The following types are of very limited distribution, and for this reason have not been included in the general classification. It is difficult in some cases to determine the races in which they should be placed, and it is probably safer, therefore, not to place them definitely until further studies of their characteristics have been made.

Biscochuelo.

SANTIAGO DE CUBA.

This is a very distinct type and undoubtedly the best grown at Santiago de Cuba. Considered from every point of view it would seem to be, in fact, the most desirable type in the Island of Cuba. While it is more fibrous than the Filipino race, and of a less piquant flavor, it has the great advantage of being productive, which more

FRUIT AND SEED OF THE BISCOCHUELO MANGO, SANTIAGO DE CUBA. THIS IS ONE OF THE BEST SEEDLING TYPES IN THE ISLAND.

than outweighs the points against it. Its origin is obscure, but it is quite probable that it was introduced from Santo Domingo by the French settlers. It is grown rather commonly in the hills back of Santiago, especially around El Caney, and is abundant in the markets during July, selling for $2.00 per 100. Its affinities do not seem to lie with either the *mango* or *manga* races.

The fruit is broadly oval, weighing 8 to 14 ounces and of a clear orange-yellow color, rarely stained by anthracnose. The flesh is firm and meaty, fibrous around the ventral edge of the seed but elsewhere almost free from fiber, and of a rich, sweet flavor which is very pleasant. It keeps well and is often shipped to Habana. It seems well worth propagating elsewhere in the island.

It may be described as follows:

Form oval to sub-reniform, decidedly oblique, length 3 to 4 inches, weight 8 to 14 ounces; left shoulder rounded to very broad and marked by a deep suture which extends down the ventral surface of the fruit 1-4 or 1-3 of the distance to the apex, right shoulder usually falling abruptly, sometimes marked by a shallow suture; apex somewhat wedge-shaped, broad, with sometimes a tendency toward a beak, the nak prominent; surface smooth, clear, light orange-yellow in color, with very numerous small russet dots; skin thick and tough; flesh bright orange-yellow; very firm and meaty, juicy, the aroma not pronounced but very pleasant; quality good; flavor unusually pleasant, very sweet even when the fruit is rather hard; fiber objectionable around the ventral side of the fruit, slight on the sides; seed reniform, 2½ to 3 inches long, plump, containing 3 to 5 embryos.

Chino.

CIENFUEGOS.

This is a famous fruit, originally grown in the Quinta Aviles at Cienfuegos and now produced in a few other gardens as well. It is probably the largest seedling mango in Cuba, and is well known in Habana markets, where single specimens sell for 20 to 40 cents. Size is its principal virtue, however, for it is fibrous and rather lacking in flavor.

The people of Cienfuegos class this as *mango*, and the habit of the tree as well as some of the characteristics of the fruit are distinctly those of the *mango* race.

It may be described as follows:

General form broad cordate, very plump, usually somewhat oblique at base; length 3 to 5½ inches; weight 12 to 20 ounces; cavity shallow, broad, somewhat irregular; shoulders sometimes nearly equal, but more often the left one broad and rather high, the right rounded and falling; apex rounded, the nak slightly raised, ¼ inch above longitudinal apex; surface smooth, greenish-yellow to dull cream colored, overspread around the base with light red, the dots numerous, very small and inconspicuous; skin usually thick and tough; flesh deep yellow in color, orange-yellow toward the

A FRUIT OF MANGO CHINO WEIGHING 16 OZ. FROM THE QUINTA AVILES, CIENFUEGOS. ONE OF THE LARGEST CUBAN TYPES.

seed, and of very firm, meaty texture, juicy, with faint aroma; quality fair; flavor sub-acid, spicy; fiber abundant throughout the flesh; seed oval, rather thin, 2½ to 3 inches long, containing 4 to 6 embryos.

The season of ripening corresponds with that of the *mango* race, as do the bearing habits of the tree.

Mamey.

CIENFUEGOS.

Another type grown in the Quinta Aviles at Cienfuegos, and of better quality than Chino, though not so well known in Habana as the latter. It is classed by the natives as *manga,* because of the habit of the tree and the general character of the fruit. It is smaller than Chino, but of somewhat more attractive color, as a rule, and of sweeter, richer flavor.

General form broadly cordate, not as plump laterally as many fruits of the *manga* race, length and breadth nearly equal; length 3 to 3½ inches, weight 8 to 12 ounces; base flattened, very slightly oblique; cavity narrow, flaring, almost regular; right shoulder somewhat broader and higher than the left; apex with a suggestion of a beak, the nak not prominent, ¼ inch above longitudinal apex; smooth surface, greenish orange-yellow to orange-yellow in color, blushed around the base with reddish salmon, dots large, conspicuous, fairly numerous; skin thick and tough; flesh bright orange-yellow, firm and very meaty; moderately juicy, with very little aroma; quality fairly good, flavor sub-acid, rich, pleasant; fiber not very objectionable except around ventral edge of seed; seed oblong, rather thick, 2½ inches long, containing 2 to 5 embryos, the endocarp thick and woody.

The productiveness of this type, while not as good as that of *manga amarilla,* seems to be satisfactory. The season corresponds to that of *manga amarilla.*

While Chino and Mamey are the two best known mangos in the Quinta Aviles, there are a number of other types which are known by name, and some of which may have been propagated. A few trees of the Filipino race are growing in this quinta, and also trees of a long slender fruit erroneously called Filipino. Others which may be mentioned but which are not worth describing, are the following:

Mango de Olor
Garcia
Melocoton
Manga manzana
Caña
Crêma
Morado

MANGA MAMEY, FROM THE QUINTA AVILES, CIENFUEGOS. A HANDSOME FRUIT OF GOOD QUALITY.

Corazon.

SANTIAGO DE CUBA.

This is one of the commonest types in the markets of Santiago, but is not a fruit of great merit. Its relationships are difficult to determine.

It may be described as follows:

General form oblong-cordate to broad-cordate; length 3 to 3½ inches, weight 5 to 8 ounces; base varying from level, flattened, with the shoulders equal, the stem inserted in a shallow cavity, to oblique, the left shoulder high and rounded, the right shoulder falling gradually; apex broadly pointed, sometimes almost beaked, in other instances rounded, nak depressed; surface smooth, greenish-yellow to dull yellow in color, sometimes tinged with salmon near the base, the dots medium large, rather conspicuous; skin rather thin; flesh bright yellow-orange, very juicy, the aroma pronounced and very pleasant; quality poor; flavor piquant, sweet, rich; fiber very objectionable, abundant throughout the flesh; seed oblong reniform, 2½ inches long, plump, containing 3 to 5 embryos.

Mamey.

SANTIAGO DE CUBA.

This name is applied to various types throughout the island; it is, in fact, one of the commonest names given to seedling forms. The Mamey of Santiago de Cuba is an important and well defined type, however, and is therefore deserving of description. It is not a fruit of any great merit, but is very abundant in the markets.

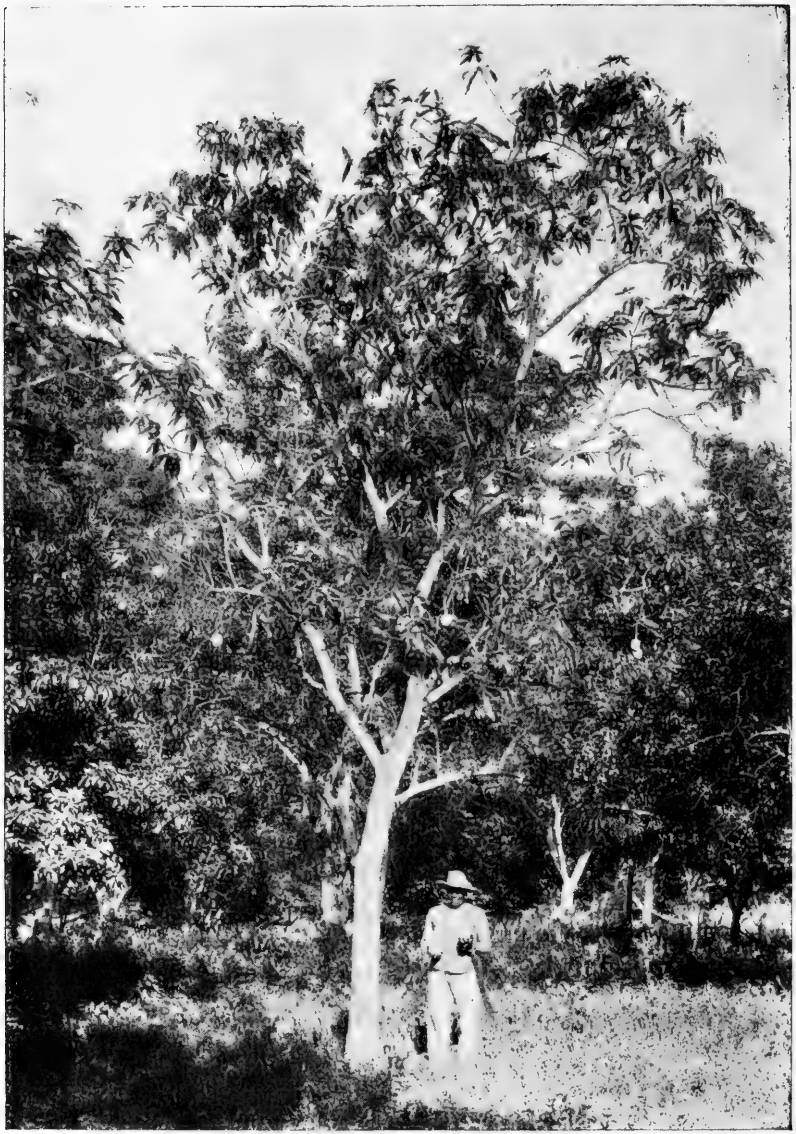
It may be described as follows:

Form oblong-oval, slightly oblique, plump; length 2½ to 3½ inches, weight 4 to 8 ounces; cavity very shallow, left shoulder rather high and broad, right shoulder falling gradually; apex blunt, the nak slightly depressed; surface smooth, greenish-yellow to deep yellow in color, sometimes tinged with salmon near the base, dots rather conspicuous, skin rather thin but tough; flesh bright yellow-orange, very juicy, the aroma pronounced and very pleasant; quality poor; flavor piquant, sweet, rich, very pleasant; fiber abundant, long, throughout the flesh; seed oblong-reniform, about 2½ inches long, containing 3 to 5 embryos.

Toledo.

SANTIAGO DE CUBA.

This is a small fruit, of rather unattractive appearance. It is common in the markets of Santiago de Cuba, however, and is well defined, the name being applied to this one type only.



SEEDLING TREE OF MANGO CHINO IN FRUIT, QUINTA AVILES, CIENFUEGOS.

It is characterized as follows:

Form ovate-oblique to ovate-reniform; length 2½ inches. weight 2 to 4 ounces; base oblique, the left shoulder high and rounded, the right shoulder falling abruptly; apex broadly pointed to rounded, having the suggestion of a beak; surface smooth, greenish-orange in color, dots almost none; skin moderately thick; flesh light yellow, very juicy with a strong aroma; quality poor; flavor aromatic, sweet, pleasant; fiber very abundant throughout the flesh; seed oblong-reniform, 2 inches long, containing 3 or 4 embryos.

Other Types at Santiago de Cuba: There are quite a number of types cultivated in the vicinity of Santiago de Cuba besides those just described, but none of them seems to be very common, and the names applied to them are used so indefinitely that it is impossible to define the types. The name *Señora* is well known in the markets, and is applied to a number of large fruits, more or less similar in character, and of fine appearance but fibrous. *Obispo* is another name similarly used. *Mameyzon* is applied to several fruits resembling the *manga mamey* of Cienfuegos. *Papelina* is a small, greenish fruit of inferior quality which does not seem to be common and is not worthy of notice. *Rosita* is another very small fruit, something like *Toledo*, with a reddish cheek. We found specimens of it in the markets of Guantánamo.

Cuban Mangos in Florida.

Considering the proximity of Florida and Cuba, and the frequent communication between the two regions in the early days by means of sailing vessels, it is but natural that Florida should have received most of her seedling mangos from Cuba. Mention has already been made of several Cuban types which commonly occur in Florida, but in order to bring them all together a list of the commonest ones is here given:

Mango Race: This has become fairly common in southeastern Florida under the name of No. 11, and is said to have been introduced from Jamaica. Prof. Rolfs describes this race under the name of "No. 11 group," and mentions one named variety which has been propagated.

Manga Race: The majority of seedlings in southeastern Florida are of this race.

Manga amarilla Type: This is the principal one grown in the Miami region, and is usually called "turpentine mango," sometimes "peach mango." The fruits of most of the trees around Miami are remarkably uniform in character. Prof. Rolfs does not define this group separately, but it appears to be included in his "turpentine group."

Manga blanca Type: This includes the seedlings known in the vicinity of Miami as "apple" mango and "Bombay" mango. It is fairly abundant, but less so than the *manga amarilla* type. The "Bombay group" of Prof. Rolfs belongs to this type, and probably the "Eleanor group" also.

Filipino Race: This is fairly well known around Miami under the name of Philippine mango, numerous trees having been grown from Cuban seeds. One named variety, the Cecil, has been propagated by budding. The Cambodiana mango, introduced by the Department of Agriculture, also belongs to this race. It corresponds to the "Cambodiana group" established by Prof. Rolfs.

A thorough study of the Indian mangos cultivated in Florida has not yet been made for the purpose of classifying them, but we are beginning to find that many of them fall naturally into types. Prof. Rolfs has made a beginning at classification by establishing the Sandersha, Mulgoba, and Gola groups. The several Alphonse mangos fall naturally into one group, and exhibit many characteristics in common. A study of these mangos in India would doubtless produce more satisfactory results than an attempt to classify them from the few varieties which we are now cultivating in this country.